

What is claimed is:

1. (Amended) A 1,4-diacetylene polymer that is soluble in an organic solvent, composed of a repeating unit represented by the general formula $=CR-C\equiv C-CR' =$ (wherein R and R' represent identical or different monovalent organic substituents), and has an average degree of polymerization of 4 to 200 and a ratio (Mw/Mn) of weight average molecular weight (Mw) to number average molecular weight corresponding to said average degree of polymerization (Mn) of 1.1 to 5.0; wherein,

the organic substituents R and R' are selected from:

$(CH_2)_m OCONHCH_2COOC_n H_{2n+1}$ (wherein m represents an integer within the range of 3 to 6, and n represents an integer within the range of 1 to 10),

$(CH_2)_m CONHCH_2COOC_n H_{2n+1}$ (wherein m represents an integer within the range of 3 to 6, and n represents an integer within the range of 1 to 10),

$(CH_2)_m OSO_2C_6H_4CH_3$ (wherein m represents an integer within the range of 3 to 6), and

$(CH_2)_m OCONHCH_2CONHC_n H_{2n+1}$ (wherein m represents an integer within the range of 3 to 6, and n represents an integer within the range of 1 to 10).

2. (Deleted)

2. (Original claim 3 amended) A process for producing the 1,4-di-substituted diacetylene polymer as claimed in claim 1 comprising: irradiating a solution of soluble 1,4-di-substituted diacetylene polymer with laser light having a wavelength within the range of 250 to 1,200 nm, and preferably 550 to 900 nm, to cause a photodegradation reaction of said polymer.

3. (Original claim 4 amended) A process for producing a 1,4-di-substituted diacetylene polymer as claimed in claim 4 wherein the irradiation time is from 10 seconds to 180 minutes.

4. (Original claim 5 amended) A process for producing the 1,4-di-substituted diacetylene polymer as claimed in claim 1 comprising: heating a solution of soluble 1,4-di-substituted diacetylene polymer to a temperature of 100 to 300°C to cause thermal degradation of said polymer.

5. (Original claim 6 amended) A process for producing a 1,4-di-substituted diacetylene polymer as claimed in claim 5, wherein the heating time is from 30 minutes to 5 hours.

6. (Original claim 7 amended) A composite composition in which the 1,4-di-substituted diacetylene polymer as claimed in claim 1 is compatible with a transparent sheet.

7. (Original claim 8 amended) The composite composition as claimed in claim 7, wherein the transparent sheet is selected from an aromatic vinyl resin, acrylic resin, polyester, polycarbonate, polyurethane, polyamide, polysulfone, polycyclopentadiene, photosetting resin and thermosetting resin.

8. (Original claim 9 amended) A composite composition with an inorganic polymer obtained by reacting the 1,4-di-substituted diacetylene polymer as claimed in claim 1 in a polycondensation reaction with a metal alkoxide represented by alkoxysilane.

9. (Original claim 10 amended) An optical part obtained by using a film, sheet or three-dimensional molding based on the compositions as claimed in claims 7 and 9.

10. (Original claim 11 amended) An optical part obtained by using the composite compositions as claimed in claim 5 and 7 as a surface layer.

11. (Original claim 12 amended) The optical parts according to claims 10 and 11, wherein the composite compositions as claimed in claims 7 and 9 are used in transparent sheets, microspherical resonators and optical waveguides.